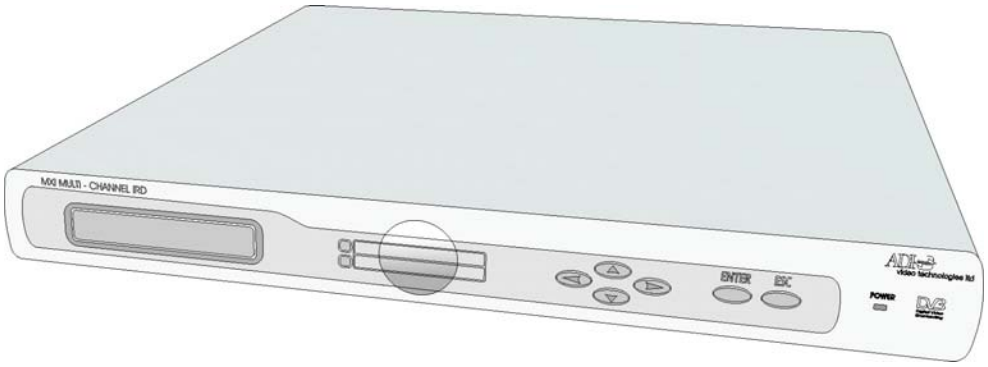
video technologies ltd

MX1 Single Channel MPEG-2 IRD
Operation Manual



Thank you for purchasing the MX1 Single MPEG-2 IRD.

This manual has been written to provide all relevant instructions for operating your MX1 Single MPEG-2 IRD. We recommend that you read these instructions before attempting to install or operate your MX1 to ensure the maximum benefit to your customers.

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About this Manual

This manual contains instructions on the minimum hardware configuration of the MX1. Where applicable, the additional options for the maximum configuration are indicated.

This manual describes the operation of the MX1 through the LCD screen.

Organization of this Manual

- **Introduction.** This chapter describes the hardware interfaces of the MX1 and the front and rear panels. It also includes a description of and instructions for working with the menu system.
- **Configuring the Input TS.** This chapter contains instructions for configuring the input TS parameters included in the Input Menu.
- **Configuring the Decoder Parameters.** This chapter contains instructions for configuring the decoder parameters included in the Decoder Menu.
- **Configuring the Output TS.** This chapter contains instructions for configuring the output TS parameters included in the Output Menu.
- **Configuring the CA System.** This chapter contains instructions for configuring the Conditional Access system parameters included in the CA System Menu.
- **Viewing the MX1 Status.** This chapter contains instructions for viewing the status of the MX1 through the Status Menu.
- **Viewing the Unit Configuration.** This chapter contains instructions for viewing the current configuration of the MX1 through the Unit Config Menu.
- **Viewing and Configuring the Communication Settings.** This chapter contains instructions for viewing and configuring the settings of the various communication ports through the Comm Settings Menu.
- **Configuring Additional Setups.** This chapter contains instructions for configuring additional parameters such as input bit rate and high jitter.
- **Glossary.** The glossary lists and explains the terms and acronyms used throughout this manual.

Conventions Used in this Manual

Indicates a note.

1

Introduction

The MX1 Single MPEG-2 integrated receiver decoder is designed to reduce cost and satisfy video, audio, and data requirements of digital broadcast television, cable and satellite operations.

The MX1 integrated receiver decoder is a fully interoperable decoder for digital media networks that complies fully with the DVB MPEG-2 standard. It decodes program services provided by up to four selected transport stream inputs.

The decoder supports a large number of applications. Inputs come from the following sources:

- Satellite – QPSK
- DVB/ASI

Outputs include the following:

- Analog video
- Analog audio
- Embedded SDI & Non Embedded SDI
- AES/EBU
- ASI

Figure 1 illustrates MX1 applications.

Legend:

LSD	Low speed data over RS-232
HSD	High speed data over RS-422
Other abbreviations	See the *Glossary* on page 41

Figure 1: MX1 Applications

The decoder supports full transport stream (TS) decryption and is compatible with all conditional access (CA) modules. Depending on the hardware configuration, the decoder can also provide embedded CA.

Two slots for Conditional Access Modules (CAM) are provided in the front panel to enable decryption of received signals and transmission of the signals in the clear to customers. Depending on the hardware configuration, additional slots are provided in the rear for the insertion of smart cards (SC) used for the embedded decryption function.

Other applications of the decoder include the following:

- Program Identification (PID) filtering and retransmission
- Digital Turnaround (DTA) and video monitoring
- Control and monitoring through IP.
  In remote mode, all decoder functions can be operated remotely from a PC under MS-WINDOWS through the IP interface.

In addition to an RS232 or RS422 communication port, the MX1 can provide a General Purpose Interface (GPI) via a 9-pin D-type connector that allows dry contact alarms. The GPI depends on the hardware configuration.

In local mode, all decoder functions can be operated through a two-line LCD window and six buttons on the front panel.

Front and Rear Panels

The front panel provides the means to locally configure the MX1. The rear panel provides the electrical and communications interfaces.

Front Panel

The front panel contains a two-line LCD window and six control buttons, which are used to configure the MX1.

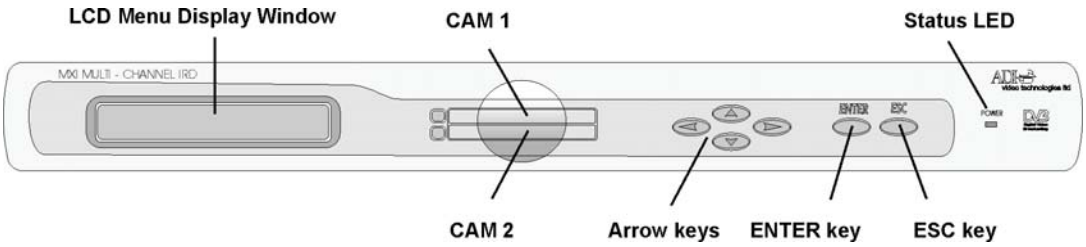

Figure 3: MX1Front Panel

The LCD window displays two lines of a selected window. The ▲ and ▼ buttons are used to scroll through the window. The ▲, ▼, ►, and ◄ buttons are used to select menu entries viewed through the LCD window. The **ENTER** button is used to save new configurations during an edit session, while the **ESC** button is used to discard new configurations.

The front panel provides two ports for the Conditional Access Modules (CAM), CAM 1 and CAM 2.

The Status LED provides status information for the MX1, as described in Table 1.

Table 1: Status LED Indications

Appearance	Significance
Dark	Power off
Blinking Green	Power up self test
Green	Operational state
Orange	Alarm
Red	Error

The rear panel contains the power connector, power switch, and communications connectors for the MX1 hardware configuration, which may vary according to configuration.

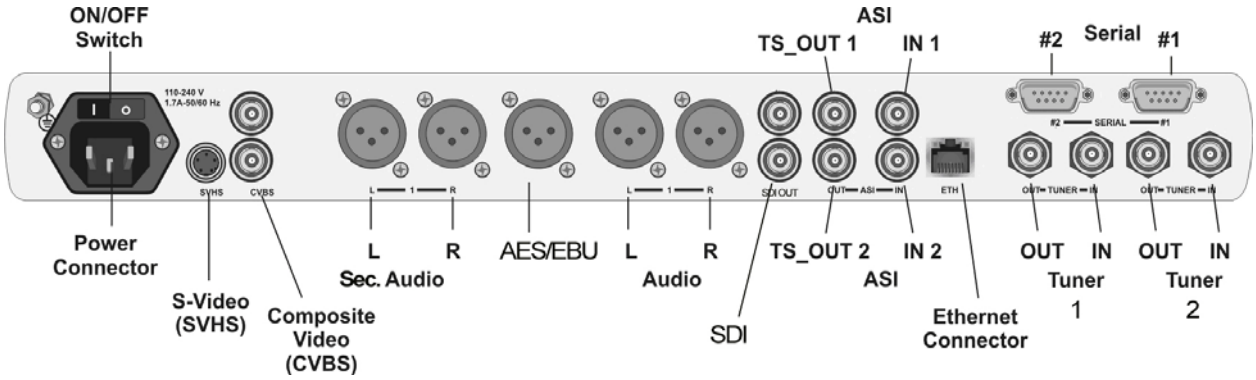

Figure 4: Rear Panel

XLR Cable Wiring

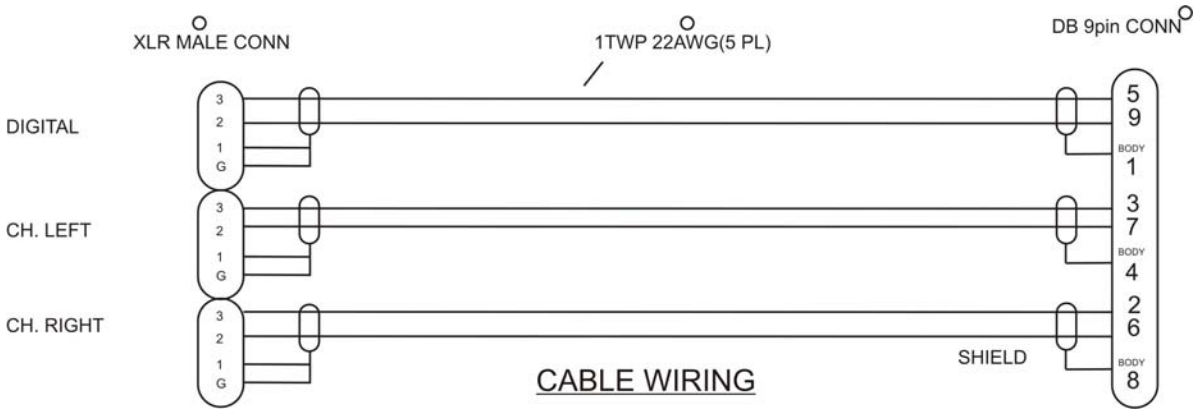

Figure 5: Rear Panel 9-Pin D-Type to XLR Connector

If you connect a computer to MX1 Serial Port 1 or 2, you must configure the computer port to the settings listed in Table 2.

Table 2: Serial Line Connection Requirements

Serial Line Parameter	Required Setting for Connected Computer
Baud Rate	115200
Parity	None
Data Bits	8

Serial Line Parameter	Required Setting for Connected Computer
Stop Bits	1
Flow Control	Xon/Xoff

To use the Ethernet port, you must configure the IP address and mask for both your computer and the MX1. For information on configuring the IP address and mask, refer to *Configuring the Network Settings* on page 38.

Features in the Full Feature Hardware Configuration

When the MX1 contains the maximum configuration, four additional BNC connectors can accommodate more input TSs, which can be four QPSK sources.

The maximum hardware configuration includes the following features:

- Two Video – Composite
- Two SDIs with embedded audio or SDI without Embedded Audio
- Two Audio – Stereo, AES/EBU
- Inputs — One QPSK, two ASI, one IP
- Outputs — Two ASI, one A/V channels
- Computer Communication – 1 RS232, 1 RS422

Powering up the MX1

To power up the MX1, connect the power to the AC main and turn on the power switch. Figure 6 shows the power connector and switch on the rear panel of the MX1.

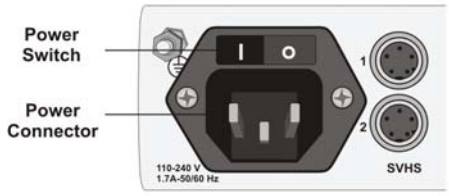

Figure 6: Power Connector and Switch

To verify correct performance, observe the changes in the Status LED on the front panel (Figure 3). Refer to Table 1 for an explanation of the status indications in the Status LED.

During power up, the Power Up Menu is displayed in the LCD Window for five seconds. After five seconds, the first two lines of the Main Menu are displayed. For more information refer to *Getting Started* on page 7.

The Menu System

This section describes the MX1 menu.

The menu is organized hierarchically as illustrated in Figure 8.

Each rectangle represents a menu.

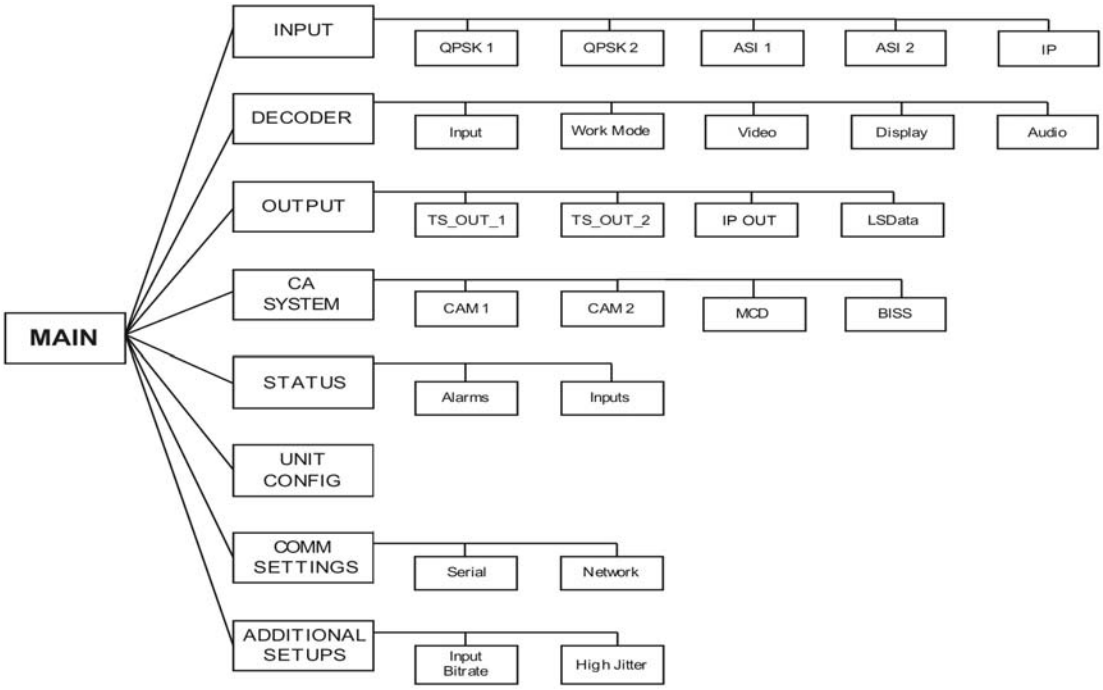

Figure 8: Menu System

Controlling the Menu

The MX1 is configured through the front panel buttons. The following six buttons are used to navigate the menu system and configure available parameters:

- ▼ scrolls downward through a menu. In edit mode, it is used to edit values.
- ▲ scrolls upward through a menu. In edit mode, it is used to edit values.
- ► enters submenus or edit mode. In edit mode, it moves the cursor to the right column.
- ◄ moves the cursor one position to the left in edit mode.
- **ENTER** enters into a submenu. If there is no submenu, pressing **ENTER** saves your changes, exits the current menu, and enters the next higher menu.
- **ESC** exits from a menu without saving information. In submenus, pressing **ESC** enters a higher menu.

The LCD window shows only two consecutive lines of a selected menu. A blinking rectangle ▮ indicates the position in the cursor.

The Main Menu and lower submenus contain options you can select using the buttons. Menus at the bottom of the hierarchy contain information that you can edit by using the arrow buttons. Data is displayed in some of the menus. Brackets in a menu indicate whether the data can be modified. The following types of brackets are used:

- { } – data cannot be modified
- < > – data can be modified

Getting Started

After the MX1 powers up, the first two lines of the Main Menu appear. Figure 10 illustrates the Main Menu screen.

Figure 10: Main Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 12 illustrates the full Main Menu.

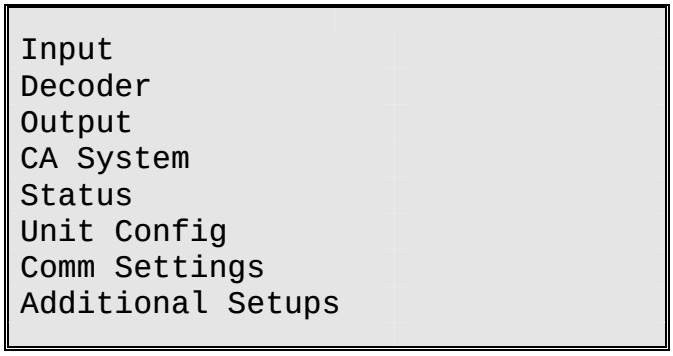

Figure 12: Full Main Menu

Table 3 lists the references in this manual for instructions on configuring the Main Menu options.

Table 3: Reference Table for Main Menu Option Configuration

Main Menu Option	Refer To
Input	*Configuring the Input TS* on page 9
Decoder	*Configuring the Decoder Parameters* on page 13
Output	*Configuring the Output TS* on page 23

Main Menu Option	Refer To
CA System	*Configuring the CA System* on page 27
Status	*Viewing the MX1 Status* on page 31
Unit Config	*Viewing the Unit Configuration* on page 35
Comm Settings	*Viewing and Configuring the Communication Settings* on page 37
Additional Setups	*Configuring Additional Setups* on page 39

2

Configuring the Input TS

The Input Menu allows configuration of the QPSK parameters and shows the status of the ASI input transport streams (TSs).

To access the Input Menu, select **Input** from the Main Menu. Figure 14 illustrates the Input Menu screen.

Figure 14: Input Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 16 illustrates the full Input Menu.

Figure 16: Full Input Menu

Configuring QPSK1 or QPSK2 Input TS

To configure parameters for a QPSK1 or QPSK2 TS input stream:

1. To configure QPSK1 parameters, select **Input** > **QPSK1**.
   To configure QPSK2 parameters, select **Input** > **QPSK2**.
   The QPSK Input Menu screen appears.

Figure 18: QPSK Input Menu Screen

To view the rest of the menu, use the scroll buttons.

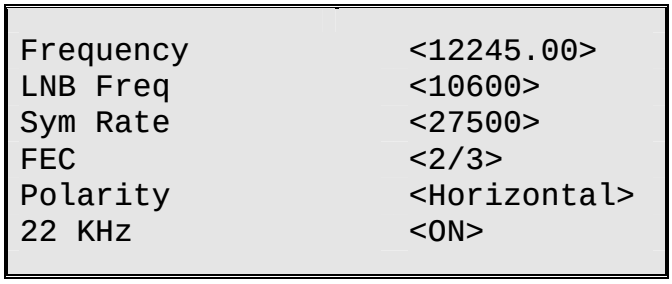

Figure 19: Full QPSK Input Menu

2. Scroll to the parameter you wish to configure and press ► to move the cursor to the right column.
3. To edit the parameter:
   - Press ► to move right one number or letter.
   - Press ◄ to move left one number or letter.
   - Press ▲ to select other values or increase a number. This depends on the parameter.
   - Press ▼ to select other values or decrease a number. This depends on the parameter.

Table 5 lists the permitted values of the QPSK parameters.

Table 5: QPSK Parameter Values

Parameter	Type	Lower Limit	Upper Limit
Frequency	Kuband	10.75 GHz	12.75 GHz
	Cband	3.0 GHz	4.200 GHz
	Lband	.950 GHz	2.150 GHz
LBN Frequency		10.000 GHz	10.000 GHz
		11.000 GHz	11.000 GHz
		11.300 GHz	11.300 GHz
		11.700 GHz	11.700 GHz

Parameter	Type	Lower Limit	Upper Limit
	Universal LNB	10.600 GHz High Band 9.7500 GHz Low Band	
	CBand	5.150 GHz	5.150 GHz
Sym (Symbol) Rate		1 MBaud	45 MBaud
FEC		1/2, 2/3, 3/4, 5/6, 7/8, or Auto	
Polarity		Horizontal, Vertical, None	
22 KHz		ON, OFF	

4. To configure additional parameters, press ◄ and repeat steps 2 - 3.
5. To save your changes, press **ENTER**. The LCD displays the first two lines of the Main Menu.
   To discard your changes, press **ESC**. The LCD displays the first two lines of the Main Menu.

Configuring the IP Input TS

To configure parameters for IP TS input stream:

1. Select **Input** > **IP**.
2. Define the **PORT NUMBER**.

```
PORT NUMBER          <11111>
IP TYPE              <MULTICAST>
```

3. Choose the IP Type: **UNICAST** or **MULTICAST**.
4. In case **MULTICAST** chosen you should change the **MULTI** IP according to source stream unit IP.

```
UNI                  <10.10.10.10>
MULTI                <225.20.20.20>
```

10.10.10.10 IS THE CURRENT UNIT IP ADDRESS.

225.20.20.20 IS THE SOURCE STREAM UNIT IP ADDRESS.

To edit the parameter:

- Press ► to move right one number or letter.
- Press ◄ to move left one number or letter.
- Press ▲ to select other values or increase a number. This depends on the parameter.

- Press ▼ to select other values or decrease a number. This depends on the parameter.

To save your changes, press **ENTER**. The LCD displays the Input TS Menu.
To discard your changes, press **ESC**. The LCD displays the Input TS Menu.

Viewing the ASI 1 or ASI 2 Input TS

The ASI Input Menu lists the input channels of the MX1.

The parameters in the Input Menu cannot be modified. The numbers on the left side of the menu accompanying the inputs indicate whether the input is Input 1 or Input 2.

To view the ASI Input TS:

1. From the Main Menu, select **Input** > **ASI 1** or **ASI 2**. The ASI Input Menu screen appears.

Figure 20: ASI Input Menu Screen

Channels are listed in the ASI Input Menu only when the ASI parameter in the Input Menu (Figure 16) has the value **SYNC ON**. When the ASI parameter in the Input Menu has the value **SYNC OFF**, the ASI Input Menu screen displays **No Services**.

3

Configuring the Decoder Parameters

The Decoder Menu displays the service and service provider name. Through the Decoder Menu, you can configure the parameters for controlling the decoder.

The Decoder Menu appears automatically on the MX1 screen after the system is idle for two minutes.

Figure 21 illustrates the Decoder Menu screen listing the available decoders.

To access the Decoder Menu, select **Decoder** from the Main Menu.

Figure 21: Decoder Menu Screen

Select the decoder to view the Decoder Submenu options screen.
Figure 23 illustrates the Decoder Submenu options screen.

Figure 23: Decoder Submenu Options Screen

To view the rest of the menu, use the scroll buttons. Figure 25 illustrates the full Decoder Submenu.

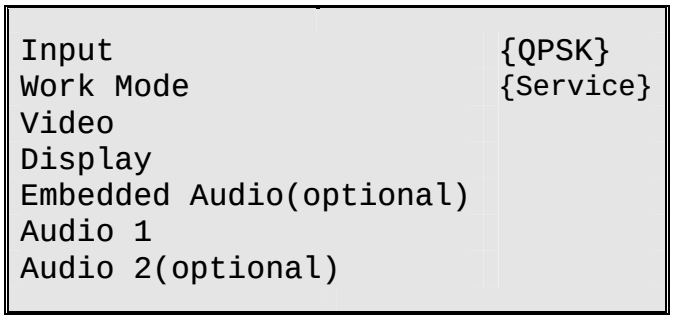

Figure 25: Full Decoder Submenu

Configuring the Decoder Input

The Decoder Input Menu shows the status of the input TSs and allows you to configure the input TS for the decoder.

To configure the parameters for the Decoder Input TS:

1. From the Main Menu, select **Decoder** > [**Decoder Name**] > **Input**. The Decoder Input Menu screen appears.

Figure 27: Decoder Input Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 28 illustrates the full Decoder Input Menu.

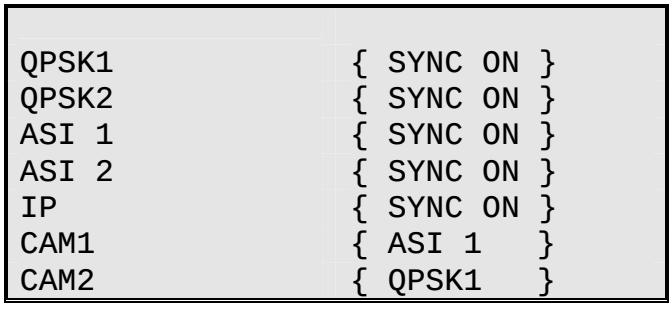

Figure 28: Full Decoder Input Menu

2. Scroll to the parameter you wish to configure and press ► to move the cursor to the right column.
3. To edit the parameter:
   - Press ► to move right one number or letter.
   - Press ◄ to move left one number or letter.
   - Press ▲ to select other values or increase a number. This depends on the parameter.
   - Press ▼ to select other values or decrease a number. This depends on the parameter.
4. To configure additional parameters, press ◄ and repeat steps 2 - 3.
5. To save your changes, press **ENTER**. The LCD displays the first two lines of the Main Menu.
   To discard your changes, press **ESC**. The LCD displays the first two lines of the Main Menu.

Configuring the Decoder Work Mode

The Decoder Work Mode Menu allows you to define the service in a TS. The following is a list of possible work modes:

- **Service Mode.** You select the service by Service ID and name, and the MX1 uses the PIDs in the System Information (SI) table to identify the Elementary Streams (ES) that comprise the service. A PID is a unique identifier for the ES.
- **PIDs Mode.** You define the service by providing a Service ID and the PIDs for each of the following streams:
  - PCR
  - Video
  - Audio
  - Audio Type
  - Teletext
  - Subtitles

Figure 30 illustrates the Work Mode Menu screen.

Figure 30: Work Mode Menu Screen

Configuring the Decoder Service Mode

To configure the decoder service mode:

1. From the Main Menu, select **Decoder** > [**Decoder Name**] > **Work Mode** > **Service Mode**. The Service Mode Menu appears. If more than two services exist, scroll down to view additional services.

Figure 32: Service Mode Menu Screen

2. To select a service, press **ENTER**. If the service has more than one audio PID, the Service Mode Submenu appears showing the choices. If more than two audio PIDs exist, scroll down to view additional audio PIDs.

Figure 33: Service Mode Submenu Screen

3. From the Main Menu, select a PID and press **ENTER.** The MX1 returns to the Work Mode Menu.
4. To continue working in the Decoder Submenu, press **ENTER** or **ESC**.

Configuring the Decoder PIDs Mode

The PIDs Menu allows you to manually assign Program Identification strings to the elementary streams within a TS.

To configure the PIDs Mode:

1. From the Main Menu, select **Decoder** > [**Decoder Name**] > **Work Mode** > **PIDs Mode**. The PIDs Mode Menu screen appears.

Figure 34: PIDs Mode Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 28 illustrates the full PIDs Mode Menu.

Figure 35: Full PIDs Mode

2. To edit the parameter:
   - Scroll down or up to select the desired input.
   - Press ► to enter the value field.
   - Press the arrow buttons to edit the value.
3. To edit additional parameters, press ◄ until the cursor is in the left part of the screen and repeat steps 2 to 3 until you are finished.
4. Press **ENTER** to save your changes. The Work Mode Menu appears.
   Press **ESC** to discard your changes. The Work Mode Menu appears.
5. Press **ESC** to return to the Decoder Submenu.

Configuring the Decoder Video Parameters

The Decoder Video Menu allows you to configure the video stream output within a TS.

To configure the video output:

1. From the Main Menu, select **Decoder** > [**Decoder Name**] > **Video**. The Video Menu screen appears.

Figure 36: Video Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 37 illustrates the full Video Menu.

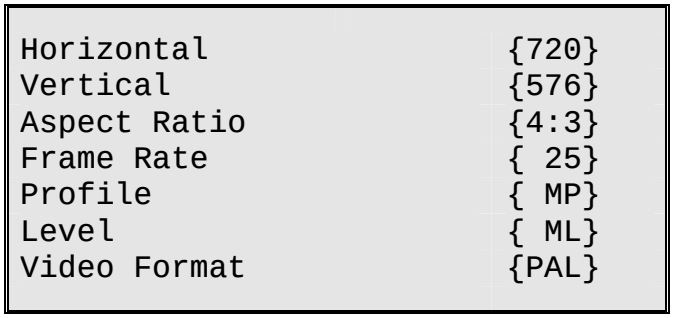

Figure 37: Full Video Menu

2. To edit the video parameters:
   - Scroll through the menu and select the desired parameter.
   - Press ► to enter the right side of the menu.
   - Press ▼ and ▲ to toggle the parameter setting.

   Table 7 lists the permitted values of the Video Menu parameters.

Table 7: Video Menu Parameter Values

Parameter	Possible Values
Horizontal	0 – 720
Vertical	0 – 576 for PAL, 0 – 480 for NTSC
Aspect Ratio	4:3, 16:9
Frame Rate	25, 30
Profile	Main (optionally: 4:2:2)
Level	Main
Video Format	PAL, NTSC, undefined

3. Press **ENTER** to save your changes and return to the left side of the menu. Press **ESC** or ◄ to discard the change and return to the left side of the menu.
4. To configure additional parameters, repeat steps 2 - 3 until all desired parameters are configured.

5. To save your changes and return to the Decoder Submenu, press ► or **ENTER**. To discard your changes and return to the Decoder Submenu, press **ESC**.

Configuring the Decoder Display

The Decoder Display Menu allows you to configure the display of special text elementary streams that appear in addition to audio and video in TS. It allows you to configure the following display options:

- Output Format
- Aspect Ratio
- AR Convert
- VBI Functions
- Test Signal

Figure 39 illustrates the Display Menu screen.

Figure 39: Display Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 26a illustrates the full Video Menu.

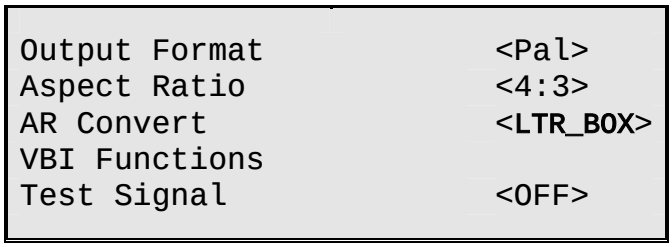

Figure 26a Full Display Menu

Configuring the Decoder Output Format

To configure the decoder output format:

1. From the Main Menu, select **Decoder** > [**Decoder Name**] > **Display**. The Display Menu screen appears (Figure 39).
2. Press ► to move the cursor to the right side of the LCD screen.
3. Press ▼ and ▲ to toggle the parameter setting. The following is a list of possible output formats:
   - PAL

- NTSC
- Auto

4. Press **ENTER** to save your changes and return to the left side of the menu. Press **ESC** or ◄ to discard the change and return to the left side of the menu.
5. To save your changes and return to the Decoder Submenu, press ► or **ENTER**. To discard your changes and return to the Decoder Submenu, press **ESC**.

Configuring the Decoder VBI Functions

To configure the Decoder VBI Functions Menu:

1. From the Main Menu, select **Decoder** > [**Decoder Name**] > **Display** > **VBI Functions**. The VBI Functions Menu screen appears.

Figure 41: VBI Functions Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 42 illustrates the full VBI Functions Menu.

Figure 42: Full VBI Functions Menu

2. To edit the parameters:
   - Scroll to select the desired parameter.
   - Press ► to move the cursor to the right side of the menu.
   - Press ▼ and ▲ to toggle the parameter setting.

   Table 9 lists the permitted values of the VBI Functions Menu parameters.

Table 9: VBI Functions Menu Parameter Values

Parameter	Possible Values
Teletext	ON, OFF
Closed Caption	None, DVS157, ATSC
WSS	ON, OFF

Parameter	Possible Values
VITS	ON, OFF

3. Press **ENTER** to save your changes and return to the left side of the menu.
   Press **ESC** or ◄ to discard your changes and return to the left side of the menu.
4. To configure additional parameters, repeat steps 2 - 3.
5. Press **ENTER** to save changes and return to the Decoder Submenu.
   Press **ESC** to discard your changes and return to the Decoder Submenu.

Configuring the Decoder Audio

The Audio menu allows you to configure the audio stream for the decoder.

To configure the Decoder audio:

1. From the Main Menu, select **Decoder** > [**Decoder Name**] > **Audio**. The Audio Menu screen appears.

Figure 44: Audio Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 45 illustrates the full Audio Menu.

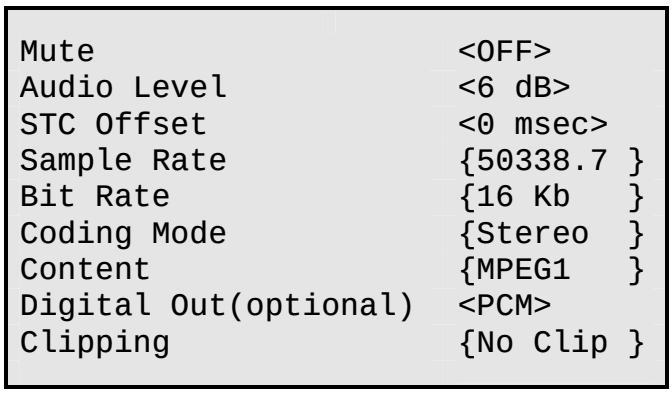

Figure 45: Full Audio Menu

2. To edit the parameters:
   - Scroll to the desired parameter.
   - Press ► to move the cursor to the right side of the menu.
   - Press ▼ and ▲ to toggle the parameter setting.

   Table 11 lists the parameters and their permitted values.

Table 11: Audio Menu Parameter Values

Parameter	Possible Values
Mute	ON, OFF
Audio Level	-26 dB to 6 dB
STC Offset	0 – 90 msec (multiples of ten)
Sample Rate	Any value complying with MPEG2 ISO/IEC standards Note: This value is read-only.
Bit Rate	Any value, in Kb Note: This value is read-only.
Coding Mode	Stereo, mono, Dolby Surround, mono mix Note: This value is read-only.
Content	MPEG 1, MPEG 2, AC3 (for Dolby surround), MP3, Undefined
Digital Out(optional)	PCM / Pass Through
Clipping	No Clip, 24, 22, 20, 18, ..., 2 dB

3. Press **ENTER** to save your changes and return to the left side of the menu.
   Press **ESC** or ◄ to discard your change and return to the left side of the menu.
4. To configure additional parameters, repeat steps 2 - 0.
5. Press ► or **ENTER** to save changes and return to the Decoder Submenu.
   Press **ESC** to discard your changes and return to the Decoder Submenu.

4

Configuring the Output TS

The Output Menu allows you to choose the decoder output. In order to send TSs to external devices, you must first configure the two output TSs. The first output TS receives the same TS as the decoder input TS and is therefore read-only in the Output Menu. The second output TS can use a different input TS.

To access the Output Menu, select **Output** from the Main Menu. Figure 47 illustrates the Output Menu screen.

Figure 47: Output Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 49 illustrates the full Output Menu.

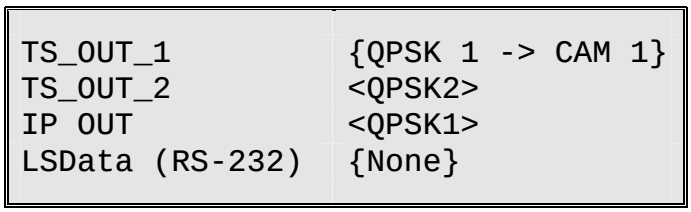

Figure 49: Full Output Menu

Configuring the Output TS_OUT_2

To configure the output TS_OUT_2:

1. From the Main Menu, select **Output**. The Output Menu screen appears (Figure 47).
2. Scroll down to **TS_OUT_2** and press ► to move the cursor to the right side of the LCD screen.
3. Press ▼ and ▲ to toggle the parameter setting. The following is a list of possible values:
   - QPSK1
   - QPSK2

- ASI 1
- ASK 2
- CAM 1
- CAM 2

If CAM 1 or CAM 2 is selected, the TS_OUT_2 Submenu is displayed to enable selection of an input stream for decryption. For instructions on configuring the TS_OUT_2 CAM parameters, see *Configuring the TS_OUT_2 CAM Parameters* on page 24.

4. Press **ENTER** to save your changes and return to the left side of the menu.
   Press **ESC** or ◄ to discard your changes and return to the left side of the menu.
5. Press **ENTER** to save your changes. The Decoder Submenu appears.
   Press **ESC** to discard your changes. The Decoder Submenu appears.

Configuring the TS_OUT_2 CAM Parameters

The TS_OUT_2 CAM parameters need to be configured if you select CAM 1 or CAM 2 as the input to Output 2.

To configure the TS_OUT_2 CAM parameters:

1. Navigate to the TS_OUT_2 Submenu. For instructions, see *Configuring the Output TS_OUT_2* on page 23. The TS_OUT_2 Submenu screen appears.

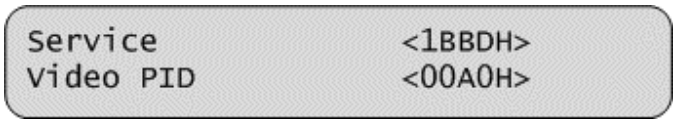

Figure 51: TS_OUT_2 Submenu Screen

To view the rest of the submenu, use the scroll buttons. Figure 52 illustrates the full TS_OUT_2 Submenu.

Figure 52: Full TS_OUT_2 Submenu

The value 2000H indicates that no PID exists for Teletext.

2. To edit the parameters:
   - Press ► to enter the right side of the menu.
   - Press ▼ and ▲ buttons to edit the PID.

- Press **ENTER** to save your changes and return to the left side of the menu.
  Press **ESC** or ◄ to discard your changes and return to the left side of the menu.
- To configure additional parameters, repeat steps 2 - .
- Press ► or **ENTER** to save changes and return to the Output Menu.
  Press **ESC** to discard your changes and return to the Output Menu.

Configuring the IP Out

1. Select **OUTPUT**.
2. Press ► over **IP OUT.**
3. Use ▼ and ▲ buttons to change the input or to set it on **off**.
4. Press **ENTER.**
5. Change the destination IP address:

IP	<225.20.20.20>

6. Define the port number:

PORT NUMBER	<11111>

7. choose the **Mode:**
   (no change, service filter, Block all, Bypass all)

Mode	<Service filter>
Bit Rate	{ 18 M }

8. If Service filter chosen, press **ENTER** to select/deselect a service.

Configuring the Low Speed Data (RS-232)

To configure the low speed data (RS-232):

1. From the Main Menu, select **Output**. The Output Menu screen appears (Figure 47).
2. Press ▼ to scroll down to **LSData (RS-232)**.
3. Press ► to configure the low speed data (RS-232). The LSData Menu screen appears.

Figure 54: LSData Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 55 illustrates the full LSData Menu.

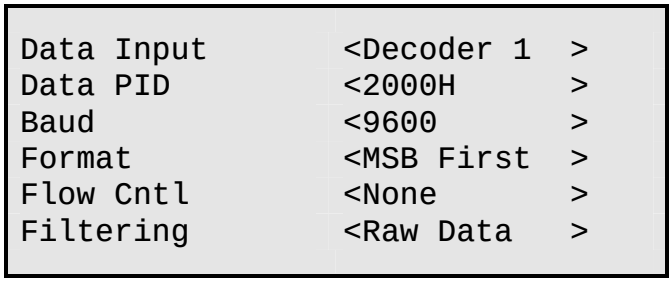

Figure 55: Full LSData Menu

4. To configure the parameters:
   - Press ► to enter the right side of the menu.
   - Press ▼ and ▲ buttons to change the parameter value.

   Table 12 lists the parameters and their permitted values.

Table 12: LSData Menu Parameter Values

Parameter	Possible Values
Data Input	Decoder 1
Data PID	2000H
Baud	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200
Format	LSB First, MSB First
Flow Cntl	None, Xon/Xoff
Filtering	RAW Data, PES Data

5. Press **ENTER** to save your changes and return to the left side of the menu.
   Press **ESC** or ◄ to discard your changes and return to the left side of the menu.
6. To configure additional parameters, repeat steps 4 - 5.
7. Press ► or **ENTER** to save changes and return to the Output Menu.
   Press **ESC** to discard your changes and return to the Output Menu.

5

Configuring the CA System

The CA System Menu allows you to configure decryption in the decoder and CAM usage.

To access the CA System Menu, select **CA System** from the Main Menu. Figure 57 illustrates the CA System Menu screen.

Figure 57: CA System Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 59 illustrates the full CA System Menu.

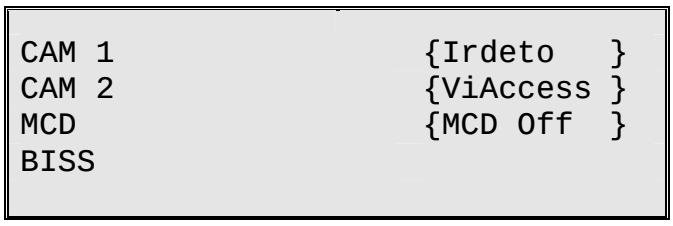

Figure 59: Full CA System Menu

Configuring the CAM 1 or CAM 2

To configure the name, input, and status of the CAM 1 or CAM 2:

1. From the Main Menu, select **CA System** > **CAM 1** or **CAM 2**. The CAM Menu screen appears.

Figure 61: CAM Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 62 illustrates the full CAM Menu.

Figure 62: Full CAM Menu

2. To edit the parameters:
   - Scroll to the desired parameter.
   - Press ► to move the cursor to the right side of the LCD screen.
   - Press ▼ and ▲ to select a new parameter value.

   Table 14 lists the parameters and their permitted values.

Table 14: CAM Menu Parameter Values

Parameter	Possible Values
Name	Cannot be edited. The field shows the name of the CAM manufacturer.
Input	QPSK1, ASI 1, ASI 2 Note: When the MX1 contains the maximum hardware configuration, options QPSK2, QPSK3, and QPSK4 may also appear.
Status	Cannot be edited. The field shows the status of the CAM

3. Press ◄ to return to the left side of the LCD screen.
4. Press **ENTER** to save your changes and return to the CA System Menu. Press **ESC** to discard your changes and return to the CA System Menu.
5. To return to the Main Menu, press **ESC**.

Configuring the MCD

The MCD Menu allows you to add and remove the decrypted services of each CAM.

Figure 64 illustrates the MCD Menu screen.

The MCD feature is only available to users of the MX1 3000 series.

Figure 64: MCD Menu Screen

Enabling or Disabling MCD

To enable or disable MCD:

1. From the Main Menu, select **CA System** > **MCD**. The MCD Menu screen appears (Figure 64).
2. Press ► to move the cursor to the right side of the LCD screen.
3. Press ▼ and ▲ to select a new parameter value. The following are possible values:
   - **MCD OFF.** Select this value to disable MCD mode.
   - **MCD ON.** Select this value to enable MCD mode.
   - Press ◄ to return to the left side of the LCD screen.
4. Press **ENTER** to save your changes and return to the CA System Menu.
   Press **ESC** to discard your changes and return to the CA System Menu.

Configuring MCD Slot 1

To configure MCD Slot 1:

1. From the Main Menu, select **CA System** > **MCD** > **Slot 1**. The MCD Slot Menu screen appears.

Figure 66: MCD Slot Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 67 illustrates the full MCD Slot Menu.

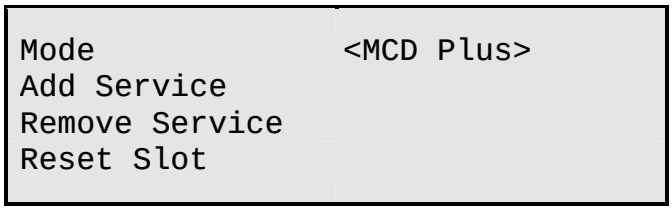

Figure 67: Full MCD Slot Menu

2. To edit the **Mode** parameter, press ► to move the cursor to the right side of the LCD screen and press ▼ and ▲ to select either **MCD Plus** or **MCD Pro**.

   To add a service, select **Add Service**. The Add Service Menu screen appears with a list of available services. Choose the service you wish to add and press **ENTER**.

   To remove a service, select **Remove Service**. The Remove Service Menu screen appears with a list of available services. Choose the service you wish to delete and press **ENTER**.

   To reset the slot, select **Reset Slot**.

3. Press **ENTER** to save your changes and return to the CA System Menu.
   Press **ESC** to discard your changes and return to the CA System Menu.

To configure the BISS parameters:

1. From the Main Menu, select **CA System** > **BISS**. The BISS Menu screen appears.

Figure 69: BISS Menu Screen

2. Select the desired parameter and press ► to move the cursor to the right side of the LCD screen.
3. Press ▼ and ▲ to change the parameter to **ON** or **OFF**.
4. Press **ENTER** to save your changes and return to the CA System Menu.
   Press **ESC** to discard your changes and return to the CA System Menu.

Parameters:

- BISS 1 -> Set SW <**********> Press ▼ and ▲ to change 12 digits.
- BISS E -> BISS MODE:
  - Injected ID -> ESW <**********> Press ▼ and ▲ to change 16 digits, and ID <**********> Press ▼ and ▲ to change 14 digits.
  - Buried ID -> ESW <**********> Press ▼ and ▲ to change 16 digits.

6

Viewing the MX1 Status

The Status Menu provides information on the alarm and input status. If the Input is QPSK, the tuner status is also provided.

To access the Status Menu, select **Status** from the Main Menu. Figure 70 illustrates the Status Menu screen.

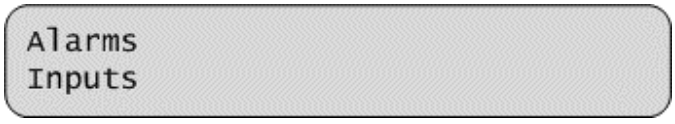

Figure 70: Status Menu Screen

Viewing Alarms

To view the MX1 alarms:

1. From the Main Menu, select **Alarms**. A list of current alarms for the MX1 system appears.

Figure 72: List of Alarms

The Alarms list is a scrollable list that displays all of the current alarms for the system. The alarms appearing on the list differ for each system.

2. Press **ESC** to return to the Main Menu.

Viewing Inputs

The Status Inputs Menu allows you to view information on the following inputs:

- QPSK1
- QPSK2
- ASI 1
- ASI 2

To access the Status Inputs Menu screen, select **Status** > **Input** from the Main Menu. Figure 73 illustrates the Status Inputs Menu Screen.

Figure 73: Status Inputs Menu Screen

To view the rest of the menu, use the scroll buttons. **Chyba! Nenalezen zdroj odkazů.** illustrates the full Status Inputs Menu.

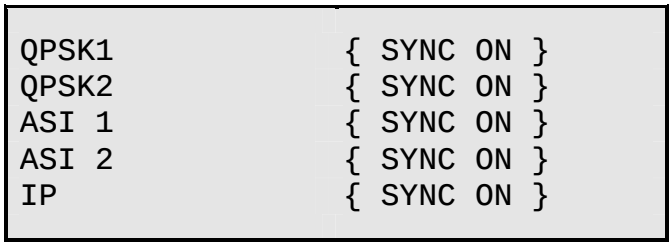

Figure 75: Full Status Inputs Menu

Viewing the QPSK1 or QPSK2 Inputs

To view the QPSK1 or QPSK2 inputs:

1. From the Main Menu, select **Alarms** > **QPSK1** or **QPSK2**. The Status QPSK Menu screen appears.

Figure 76: Status QPSK Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 77 illustrates the full Status QPSK Menu.

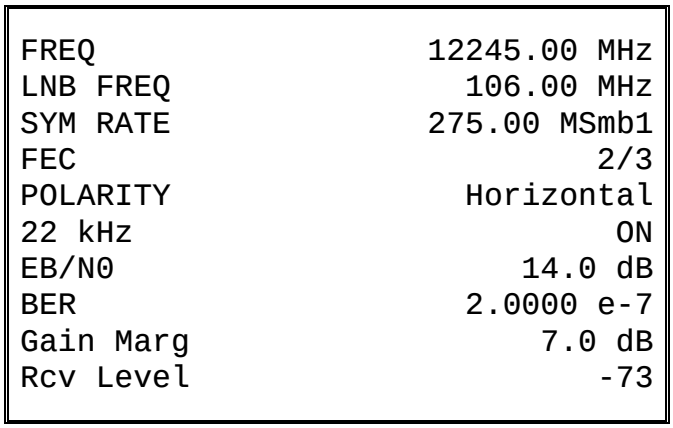

Figure 77: Full Status QPSK Menu

Table 16 lists the parameters and their permitted values.

Table 16: Status QPSK Menu Parameter Values

Parameter	Type	Possible Values
Frequency	Kuband	10.75 - 12.75 GHz
	Cband	3.0 - 4.200 GHz
	Lband	.950 - 2.150 GHz
LBN Frequency		10.000 GHz
		11.000 GHz
		11.300 GHz
		11.700 GHz
	Universal LNB	10.600 GHz High Band 9.7500 GHz Low Band
	CBand	5.150 GHz
Sym (Symbol) Rate		1 - 45 MBaud
FEC		1/2, 2/3, 3/4, 5/6, 7/8, Auto
Polarity		Horizontal, Vertical, None
22 KHz		ON, OFF
EB/N0		Signal:Noise ratio

Parameter	Type	Possible Values
BER		Bit Error Rate Note: If the MX1 displays a value of X.XXXX e-3 or higher (e.g., 2.0000 e-2) check your satellite connection.
Gain Marg		Gain Margin in Eb/N0. Note: A value less than **7 dB** indicates a critical state.
Rcv Level		-25 to -65 dbm (dynamic range of the receiver)

2. Press **ESC** to return to the Main Menu.

Viewing the ASI 1 or ASI 2 Inputs

To view the ASI 1 or ASI 2 inputs:

1. From the Main Menu, select **Status** > **Inputs** > **ASI 1** or **ASI 2**. The Status ASI Menu screen appears.

Figure 79: Status ASI Menu Screen

Table 18 lists the parameters and their permitted values.

Table 18: ASI Menu Parameter Values

Parameter	Possible Values
SYNC	**On.** The ASI source is connected and working. **Off.** The ASI source is unavailable.
Packet Length	188, 204. The packet length value is determined automatically by the system.

2. Press **ESC** to return to the Main Menu.

7

Viewing the Unit Configuration

The Unit Configuration Menu displays the current configuration of the MX1.

To access the Unit Configuration Menu, select **Unit Config** from the Main Menu. Figure 80 illustrates the Unit Configuration Menu screen.

Figure 80: Unit Configuration Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 82 illustrates the full Unit Configuration Menu.

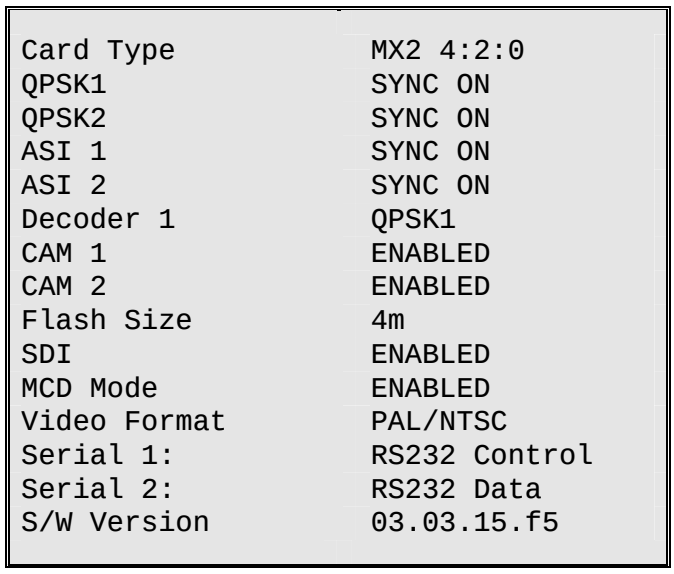

Figure 82: Full Unit Configuration Menu

To view the unit configuration:

1. From the Main Menu, select **Unit Config**. The Unit Configuration Menu screen appears (Figure 80).
2. Press **ESC** to return to the Main Menu.

8

Viewing and Configuring the Communication Settings

The Communication Settings Menu displays the MX1 parameters for communicating with a network management system. It allows you to view the serial connection settings and configure the network connection parameters.

To access the Communication Settings Menu, select **Comm Settings** from the Main Menu. Figure 84 illustrates the Communication Settings Menu screen.

Figure 84: Communication Settings Menu Screen

Viewing the Serial Settings

The Serial Menu displays the settings of the RS-232 connection.

To view the serial settings:

1. From the Main Menu, select **Comm Settings** > **Serial**. The Serial Menu screen appears.

Figure 85: Serial Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 86 illustrates the full Serial Menu.

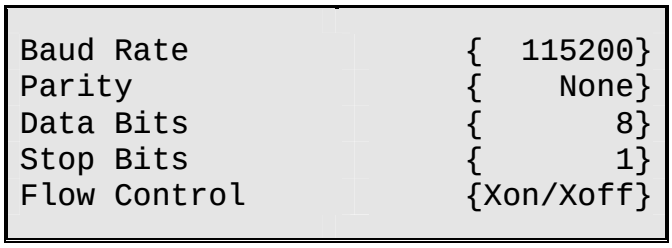

Figure 86: Full Serial Menu Screen

For a description of the Serial Menu parameters, see Table 2.

2. Press **ESC** to return to the Main Menu.

Configuring the Network Settings

To configure the network settings:

1. From the Main Menu, select **Comm Settings** > **Network**. The Network Menu screen appears.

Figure 88: Network Menu Screen

To view the rest of the menu, use the scroll buttons. Figure 89 illustrates the full Network Menu.

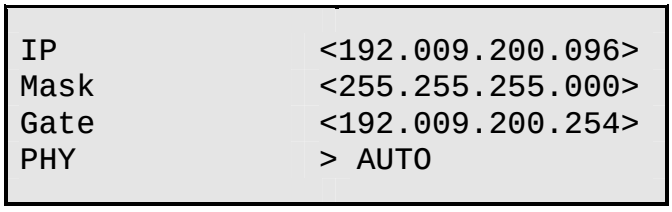

Figure 89: Full Network Menu

2. To edit the network parameters:
   - Select the parameter you wish to change and press ► to move the cursor to the right side of the LCD screen.
   - Press ▼ and ▲ to change the parameter value.
3. To configure additional parameters, press ◄ and repeat step 2.
4. To save your changes, press **ENTER**. The Comm Settings Menu appears.
5. Press **ESC** to return to the Main Menu.

9

Configuring Additional Setups

The Additional Setups Menu allows you to configure the DVB input bit rate and high jitter.

To access the Additional Setups Menu, select **Additional Setups** from the Main Menu. Figure 90 illustrates the Additional Setups Menu screen.

Figure 90: Additional Setups Menu Screen

Configuring the DVB Input Bit Rate

To configure the DVB input bit rate:

1. From the Main Menu, select **Additional Setups**. The Additional Setups Menu screen appears (Figure 90).
2. Select Input Bit Rate and press ► to move the cursor to the right side of the LCD screen.
3. Press ▼ and ▲ to change the parameter value. The following are possible values:
   - 54
   - 108
4. Press **ENTER** to save your changes.
   Press **ESC** to discard your changes.

Enabling or Disabling High Jitter

To enable or disable high jitter:

1. From the Main Menu, select **Additional Setups**. The Additional Setups Menu screen appears (Figure 90).
2. Select High Jitter and press ► to move the cursor to the right side of the LCD screen.

3. Press ▼ and ▲ to change the parameter value. The following are possible values:
   - **ON.** Select this value to enable high jitter.
   - **OFF.** Select this value to disable high jitter.
4. Press **ENTER** to save your changes.
   Press **ESC** to discard your changes.

Glossary

AES/EBU	Digital audio protocol
ASI	Asynchronous Serial Interfaces
BER	Bit Error Rate
BISS	Basic Interoperable Scrambling System
CAM	Conditional Access Module
CA System	Conditional Access system. The CA system provides decryption.
CVBS	Composite Video Bit Stream
DVB	Digital Video Broadcasting
DVR	Digital Video Recorder
FEC	Viterbi Forward Error Correction
Genlock	Signal that synchronizes quad output
ID	Identifier
MCPC	Multi-Channel per Carrier
MCD	Multi-Channel Decryption
MOD	Modulator
NTSC	National TV Standards Committee
PAL	Phase Alternating Line
PASSTHRU	Pass Through
PCR	Program Clock Reference
PID	Program Identification
PIP	Picture in Picture
Quad	Quadrature monitoring
SCPC	Single Channel per Carrier
SDI	Serial Digital Interface

SYNCH	Synchronization
SVHS	Super VHS
TS	Transport Stream
VBI	Vertical Blanking Interval